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tion II

*For two-letter codes and other abbreviations, refer to the "Guid-  
ance Notes on Codes and Abbreviations" appearing at the begin-  
ning of each regular issue of the PCT Gazette.*

(54) Title: POROUS CATALYTIC SYSTEM FOR OLIGOMERISING LIGHT OLEFINS

(57) Abstract: The present invention relates to the use of a silicon-based porous catalytic system for oligomerising light olefins said porous silicon-based catalytic system having an average pore diameter of between about 1 nm and about 5 nm and an acidity level of between about 150 µmol/g and about 650 µmol/g, and prepared from at least one hydrolysable silicon-based compound, or other source of silicon, and at least one non-ionic surface active agent. The invention also relates to a process for oligomerising light olefins using said silicon-based porous catalytic system, and to certain silicon-based porous catalytic systems.

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## INTERNATIONAL SEARCH REPORT

International Application No

PC 03/14857

## A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 B01J21/12 B01J23/46 B01J23/42 B01J29/86 B01J29/85

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 B01J

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2002/131930 A1 (LIU YU ET AL) 19 September 2002 (2002-09-19)  the whole document	1-11, 19-35, 43-47
Y	US 5 270 273 A (PELRINE BRUCE P ET AL) 14 December 1993 (1993-12-14) column 3, line 37 - column 17, line 10; claims; examples; tables	1-48
A	EP 0 272 496 A (ENIRICERCHE S.P.A.) 29 June 1988 (1988-06-29) the whole document	
Y	US 6 204 424 B1 (PUJARI AJIT ATMARAM ET AL) 20 March 2001 (2001-03-20) column 2, line 36 - column 5, line 20; claims; examples; tables	1-48

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☒ Further documents are listed in the continuation of box C.☒ Patent family members are listed in annex.

## \* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&amp;" document member of the same patent family

Date of the actual completion of the international search

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# INTERNATIONAL SEARCH REPORT

International Application No

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## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	<p>US 6 299 855 B1 (CARRAZZA JOSE ET AL)            9 October 2001 (2001-10-09)            column 2, line 53 - column 9, line 35;            claims; examples; tables            -----</p>	20-24

**Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)**

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:  
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:  
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful international Search can be carried out, specifically:
3. ☐ Claims Nos.:  
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

**Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)**

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☒ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:  
1-48
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

**Remark on Protest**

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☒ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: Claims 1-11, 19-35 and 43-47 (in as far as they relate to a substantial catalytic metal-free porous system)

A porous silicon-based catalytic system substantially free from catalytic metal; The use of said catalytic system for converting a light olefin feedstock into oligomer paraffins, and a process for converting a light olefin feedstock into oligomer paraffins using said catalytic system

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2. claims: Claims 1-10, 12, 18, 19, 25-34, 36, 39 and 43-47 (in as far as they relate to a porous system containing catalytic metals chosen from groups 8,9 and 10)

The use of a porous silicon-based catalytic system containing one or more catalytic metals chosen from groups 8,9 and 10 for converting a light olefin feedstock into oligomer paraffins, and a process for converting a light olefin feedstock into oligomer paraffins using said catalytic system

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3. claims: Claims 1-10, 12-15, 17-19, 25-34, 36-39, 41 and 43-47 (in as far as they relate to a porous system containing only platinum as catalytic metal)

The use of a porous silicon-based catalytic system containing platinum for converting a light olefin feedstock into oligomer paraffins, and a process for converting a light olefin feedstock into oligomer paraffins using said catalytic system

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4. claims: Claims 1-10, 12-16, 18-19, 25-34, 36-40 and 43-47 (in as far as they relate to a porous system containing only rhodium as catalytic metal)

The use of a porous silicon-based catalytic system containing rhodium for converting a light olefin feedstock into oligomer paraffins, and a process for converting a light olefin feedstock into oligomer paraffins using said catalytic system

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5. claims: Claims 1-10, 12-15, 18-19, 25-34, 36-39 and 42-47 (in as

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

far as they relate to a porous system  
containing platinum and  
rhodium as catalytic metal)

The use of a porous silicon-based catalytic system  
containing platinum AND rhodium for converting a light  
olefin feedstock into oligomer paraffins, and a process  
for converting a light olefin feedstock into oligomer  
paraffins using  
said catalytic system

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6. claim: Claim 48

Diesel fractions

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## INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

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